

U.S.S.N. 10,636,154

Claim Amendments

Please amend claims 1, 4, 7, 22, 27, and 33 as follows:

Please cancel claim 3 and 30 as follows:

Please add new claims 34-38 as follows:

Listing of Claims

1. (currently amended) A method of controlling the spatial distribution of RF power used to generate a plasma for processing a semiconductor device process wafer to achieve a uniform ~~density of said plasma~~ deposition and/or etch rate over an entire face of said process wafer, comprising the steps of:

(a) producing RF power from ~~a single~~ first and second RF power generators comprising a dual frequency system, said first RF power delivered to a first electrode positioned above and spaced apart from a second electrode;

(b) delivering ~~the~~ said second RF power to each of a plurality of separate electrode zones according to a matching network, said separate electrode zones comprising said second electrode, said second RF power individually deliverable in parallel from said matching network to separate electrode zones at a selected RF power level ~~according to~~ through a plurality of variable capacitors, each of said variable capacitors associated with one of said electrode zones, said separate electrode zones comprising an electrostatic chuck; and

(c) separately controlling the second RF power delivered to

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each of the electrode zones so as to produce a desired spatial distribution of said second RF power across said process wafer face in response to determining a ~~density~~ uniform deposition and/or etch rate over of said plasma ~~across~~ over said process wafer face, said desired spatial distribution of said RF power selected to achieve a uniform ~~density of said plasma across~~ deposition and/or etch rate over said entire surface of said process wafer.

2. (previously presented) The method of claim 1, wherein step (c) is performed by tuning each of a plurality of electrical circuits comprising said plurality of variable capacitors respectively associated with the zones.

3. (canceled)

4. (currently amended) The method of claim ~~[[3]]~~ 1, wherein step (c) includes tuning each of the variable capacitors to couple the second RF power to each of said associated electrode zones.

Claims 5-6 (canceled)

7. (currently amended) The method of claim 1, wherein determining said deposition and/or etch rate of said plasma ~~density~~

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comprises sensing the spatial distribution of the second RF power in a chamber used to process the semiconductor device.

8. (canceled)

9. (previously presented) The method of claim 1, wherein said separate electrode zones comprises a plurality of concentric ring electrodes insulated from one another.

Claims 10-20 (canceled)

21. (previously presented) The method of claim 1, wherein said plurality of variable capacitors comprises a capacitor network.

22. (currently amended) The method of claim 1 wherein said matching network electrically matches the second RF power ~~with~~ to a load comprising said electrostatic chuck through a capacitor network comprising said plurality of variable capacitors.

23. (canceled)

24. (previously presented) The method of claim 22 further comprising the step of tuning each of the variable capacitors by a controller in the connecting circuit.

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25. (previously presented) The method of claim 22 further comprising the step of providing said electrode zones in concentric ring electrodes.

26. (previously presented) The method of claim 25 further comprising the step of coupling the respective variable capacitors with the ring electrodes to capacitively couple said RF power from the generator to the ring electrodes.

27. (currently amended) The method of claim 25 further comprising the step of tuning the variable capacitors and controlling the amount of second RF power coupled to each of the ring electrodes.

28. (previously presented) The method of claim 1 wherein step (c) comprises sensing information related to the spatial distribution of the plasma density and delivering the sensed information to a controller, said controller controlling said desired spatial distribution of said RF power.

Claims 29-30 (canceled)

31. (previously presented) The method of claim 1, wherein said desired spatial distribution of RF power is maintained

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substantially constant as a function of time during a plasma process.

32. (previously presented) The method of claim 1, wherein said plasma density is maintained substantially uniform over said process wafer face as a function of time during a plasma process.

33. (currently amended) A method of controlling the spatial distribution of RF power used to generate a plasma for processing a semiconductor device process wafer to achieve a uniform ~~density~~ of said plasma deposition and/or etch rate over an entire face of said process wafer, comprising the steps of:

producing RF power ~~RF power~~ from ~~a single~~ first and second RF power generators comprising a dual frequency system, said first RF power delivered to a first electrode positioned above and spaced apart from a second electrode;

delivering ~~the~~ said second RF power to each of a plurality of separate electrode zones according to a matching network, said separate electrode zones comprising said second electrode, said plurality of separate electrode zones comprising a plurality of concentric ring electrodes, said second RF power individually deliverable from said matching network to said separate electrode

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zones at a selected RF power level ~~according to~~ through a capacitor network comprising a plurality of variable capacitors arranged in parallel, each of said separate electrode zones associated with one of said variable capacitors, said separate electrode zones comprising an electrostatic chuck; and

separately controlling the second RF power delivered to each of the electrode zones so as to produce a desired spatial distribution of said second RF power across of said process wafer face in response to determining a ~~density~~ deposition and/or etch rate of said plasma ~~across~~ over said process wafer face, said desired spatial distribution of RF power selected to achieve a uniform ~~density~~ deposition and/or etch rate of said plasma ~~across~~ over said entire face of said process wafer as a function of time during a plasma process.

34. (new) The method of claim 32, wherein determining said deposition and/or etch rate comprises sensing the spatial distribution of RF power in a chamber used to process the semiconductor device.

35. (new) The method of claim 32, wherein said separate electrode zones comprises a plurality of concentric ring electrodes insulated from one another.

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36. (new) A method of controlling the spatial distribution of RF power used to generate a plasma for processing a semiconductor device process wafer to achieve a uniform deposition and/or etch rate of said plasma over an entire face of said process wafer, comprising the steps of:

producing RF power from first and second RF power generators comprising a dual frequency system, said first RF power delivered to a first electrode positioned above and spaced apart from a second electrode;

delivering said second RF power to each of a plurality of separate electrode zones according to a matching network, said separate electrode zones comprising said second electrode, said plurality of separate electrode zones comprising a plurality of concentric ring electrodes, said second RF power individually deliverable from said matching network to said separate electrode zones at a selected RF power level through a capacitor network comprising a plurality of variable capacitors arranged in parallel, each of said separate electrode zones associated with one of said variable capacitors, said separate electrode zones comprising a monopolar electrostatic chuck; and

separately controlling the second RF power delivered to each

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of the electrode zones so as to produce a desired spatial distribution of said second RF power across of said process wafer face in response to determining a deposition and/or etch rate of said plasma over said process wafer face, said desired spatial distribution of RF power selected to achieve a uniform deposition and/or etch rate of said plasma over said entire face of said process wafer as a function of time during a plasma process.

37. (new) The method of claim 1, wherein said electrostatic chuck is a monopolar electrostatic chuck.

38. (new) The method of claim 32, wherein said electrostatic chuck is a monopolar electrostatic chuck.